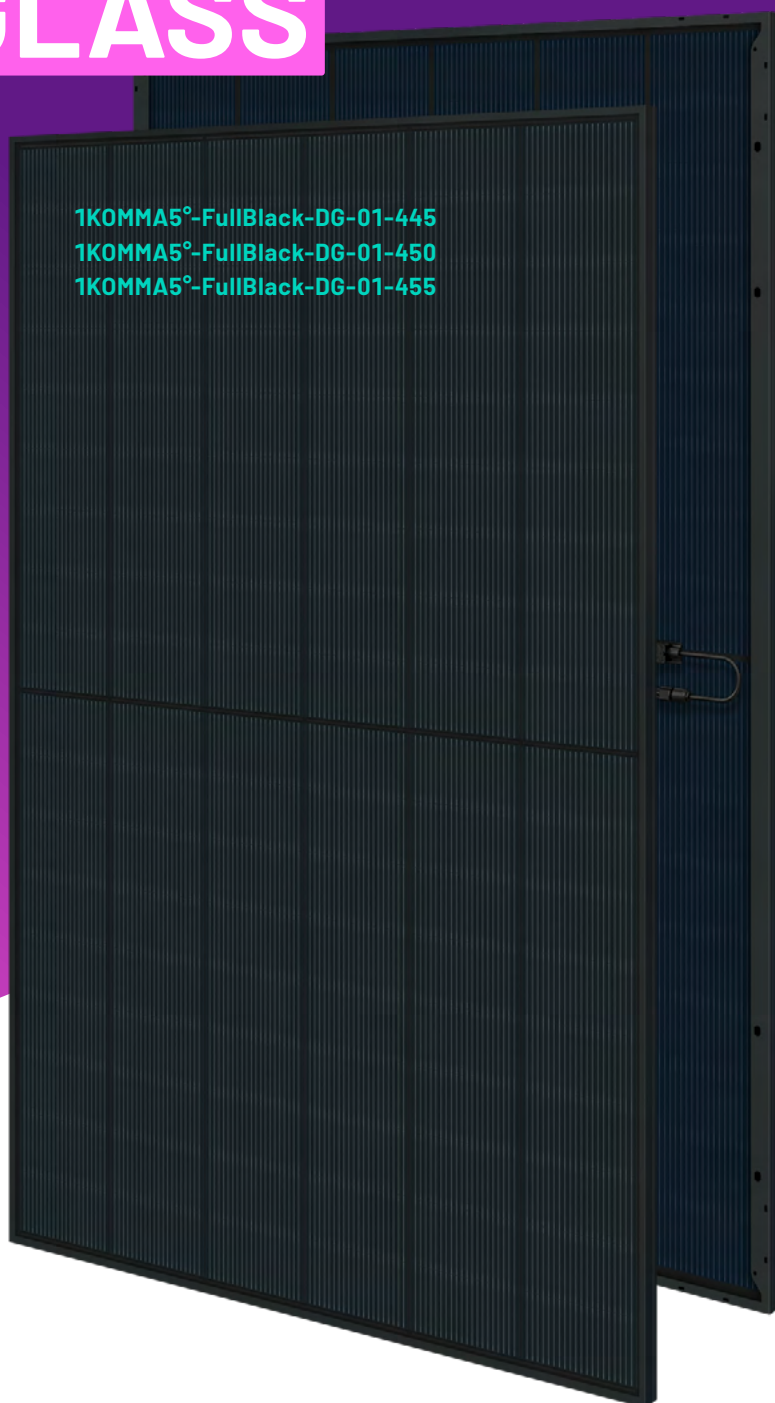


1KOMMA5°

1KOMMA5° FULL BLACK DOUBLE GLASS MODULE

- **N-Type Topcon module**
 - × Fullblack
 - × Double glass
 - × Bifacial
 - × Zero Busbar Design
- **High Power** up to 455Wp
- **1KOMMA5° Warranty**
 - × 30 years product
 - × 30 years linear performance warranty
- **Highest quality** and ethical standards
- **With polysilicon** from Germany

1KOMMA5°-FullBlack-DG-01-445
1KOMMA5°-FullBlack-DG-01-450
1KOMMA5°-FullBlack-DG-01-455



Designed in /
with raw materials from



FULL BLACK DOUBLE GLASS MODULE

MODULE SPECIFICATION

Cell type	N -type monocrystalline, 108 (6 × 18)
Dimensions (L × W × H)	1,762 × 1,134 × 30 mm
Weight	24,4 kg
Front	2 mm tempered glass
Rear	2 mm tempered glass
Junction box	3 Diodes, IP68 » IEC 62790
Cable	4 mm ² , 1,300 mm
Plug type (IEC)	PV-KST4-EV02A/xy; PV-KBT4-EV02A/xy (Stäubli)

ELECTRICAL DATA

Module	445 Wp		450 Wp		455 Wp	
Test conditions	STC ¹	BNPI ²	STC ¹	BNPI ²	STC ¹	BNPI ²
Rated output [P _{mpp} / Wp]	445.0	485.0	450.0	490.0	455.0	495.0
Rated voltage [V _{mpp} / V]	33.22	33.23	33.39	33.40	33.56	33.57
Rated current [I _{mp} / A]	13.40	14.60	13.48	14.67	13.56	14.75
Open circuit voltage [V _{oc} / V]	39.20	39.21	39.40	39.41	39.60	39.61
Short circuit current [I _{sc} / A]	14.19	15.56	14.28	15.63	14.36	15.71
Module efficiency	22.30		22.50		22.80	

ELECTRICAL CHARACTERISTICS WITH 10% BIFACIAL GAINS

Module	445 Wp	450 Wp	455 Wp
Rated output [P _{mpp} / Wp]	490.00	495.00	501.00
Rated voltage [V _{mpp} / V]	33.22	33.39	33.56
Rated current [I _{mp} / A]	14.73	14.82	14.91
Open circuit voltage [V _{oc} / V]	39.20	39.40	39.60
Short circuit current [I _{sc} / A]	15.61	15.70	15.80

MODULE CHARACTERISTICS

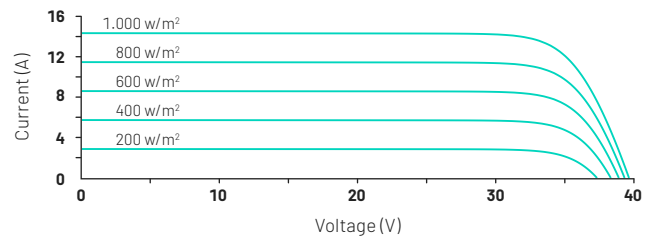
Max. System voltage (IEC/UL)	1,500 VDC
Max. fuse Rating	30 A
Fire protection class	A according to UL790
Maximum mechanical test load, Push/Pull (Pa)	5,400 / 2,400
Maximum design load, Push/Pull (Pa)	3,600 / 1,600
Performance tolerance	0 ~+ 3 %
Protection class	II
Frame	Black anodised aluminium
Annual degradation (1st year)	≤ 1.0 %
Annual degradation (2nd – 30th year)	Max. 0.4 % per year

TEMPERATURE VALUES

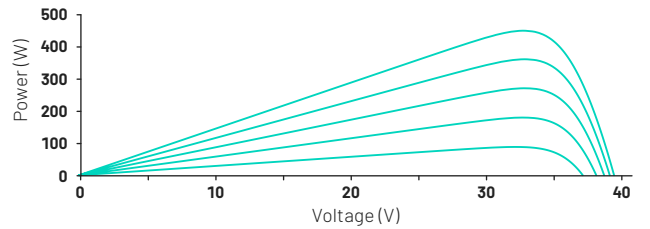
Temperature coefficient (P _{mpp})	-0.29 %/°C
Temperature coefficient (I _{sc})	+0.043 %/°C
Temperature coefficient (V _{oc})	-0.25 %/°C
Nominal module operating temperature (NMOT)	41 ± 2°C
Operating temperature (°C)	-40 to +85

POWER CURVES

Current-voltage curve (450 W)



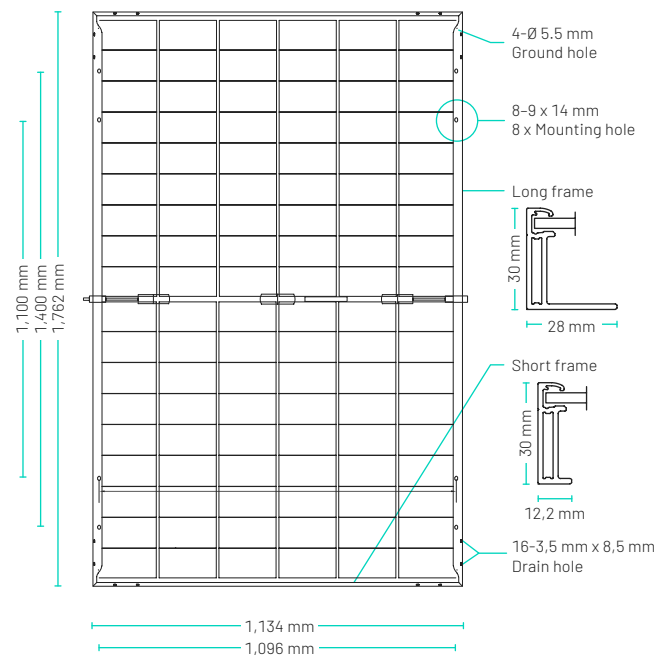
Power-voltage curve (450 W)



PACKAGING INFORMATION

Container	40' HQ
Pallet dimensions (L × W × H)	1,794 × 1,125 × 1,255 cm
Pieces per pallet	36
Pieces per container	936

TECHNICAL DRAWING



CERTIFICATIONS

IEC 61215, IEC 61730

Additional Certificates on request

1 STC Irradiance 1000W/m², Cell Temperature 25°C, AM=1.5 Tolerance: P_{mpp} ±3%, V_{oc} ±3% and I_{sc} ±4%.

2 BNPI Irradiance front 1,000W/m², rear 135 W/m², Cell Temperature 25°C, AM=1.5 | Bifaciality [P_{mpp}/I_{sc}]: 80±5 %, Bifaciality [V_{oc}]: 98±5 %

